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Nagase

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(54) **SPARE TIRE COVER SUPPORTING STRUCTURE**

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B62D 43/02 (2006.01)

(52) **U.S. Cl.** **224/42.12,**

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224/42.2, 42.21, 42.25; 296/37.2; 414/463,
414/465, 466; 292/DIG. 6

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,526,539 A * 10/1950 Carroll 292/17
2,698,118 A * 12/1954 Dickason 224/42.21
3,061,346 A * 10/1962 Jorgensen 292/17

3,326,434 A * 6/1967 Cheadle 224/42.21
4,817,834 A * 4/1989 Weiler 224/509
5,333,766 A * 8/1994 Fisher 224/42.21
5,564,611 A * 10/1996 Weiler 224/502
5,746,456 A * 5/1998 Violi et al. 292/146
6,477,798 B1 11/2002 Giesey et al.
6,954,992 B2 * 10/2005 Hwang 34/108
7,299,809 B2 * 11/2007 Kang 134/57 DL

FOREIGN PATENT DOCUMENTS

JP 09058534 A * 3/1997
JP 11-192900 A 7/1999
JP 2000-247237 A 9/2000
JP 2001071951 A * 3/2001

* cited by examiner

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(57) **ABSTRACT**

A spare tire cover supporting structure includes: a transverse rear door, provided on a vehicle; a spare tire cover, including a first end and a second end, the first end supported on the transverse rear door, the spare tire cover operable to cover a spare tire held on the transverse rear door; a mounting member, detachably mounting the second end on the transverse rear door; and a supporting member, provided on one of the transverse rear door and the second end of the spare tire cover. When the second end of the spare tire cover is mounted on the transverse rear door by the mounting member or the second end of the spare tire cover is detached from the transverse rear door, the supporting member positions the spare tire cover relative to the transverse rear door and restricts an opening movement of the spare tire cover.

7 Claims, 11 Drawing Sheets

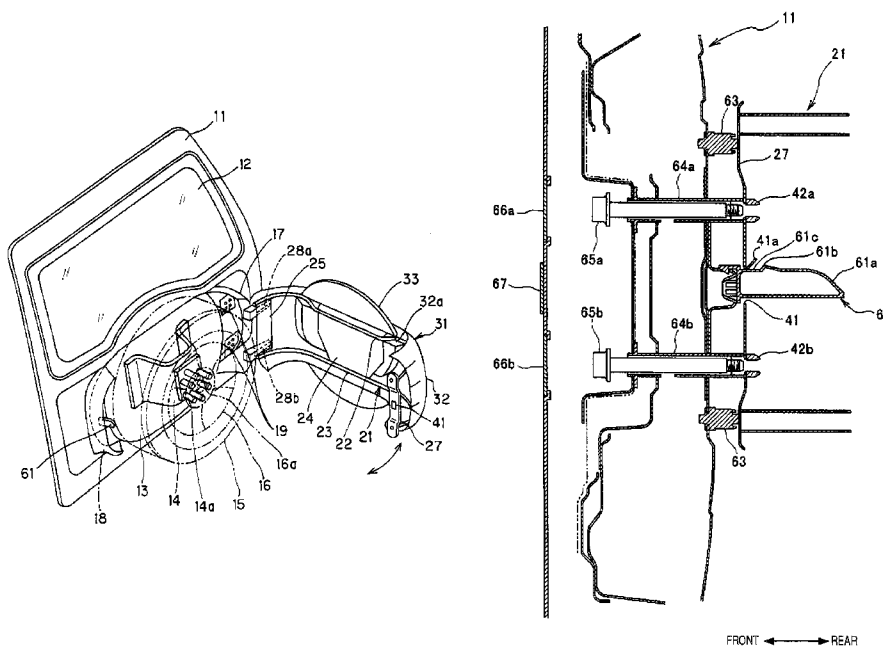
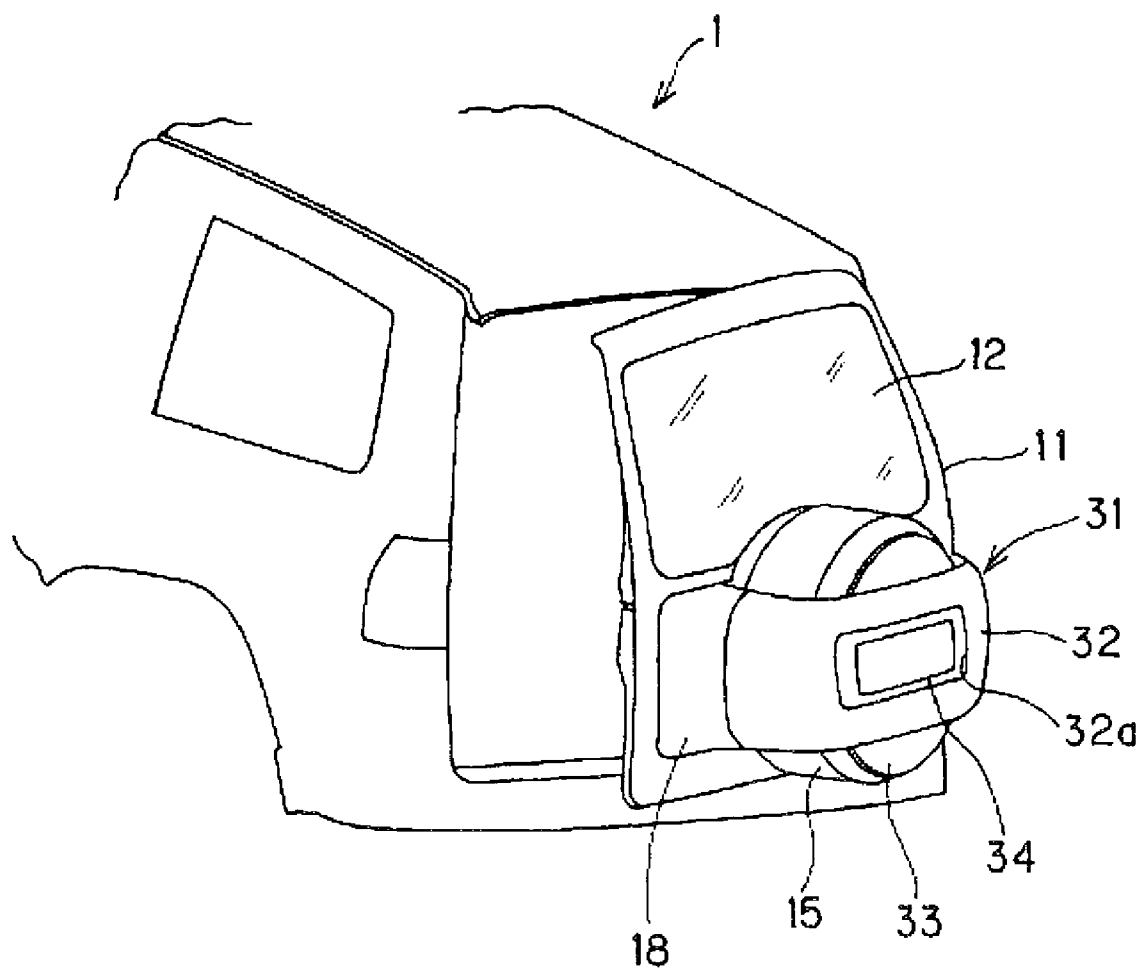


FIG. 1

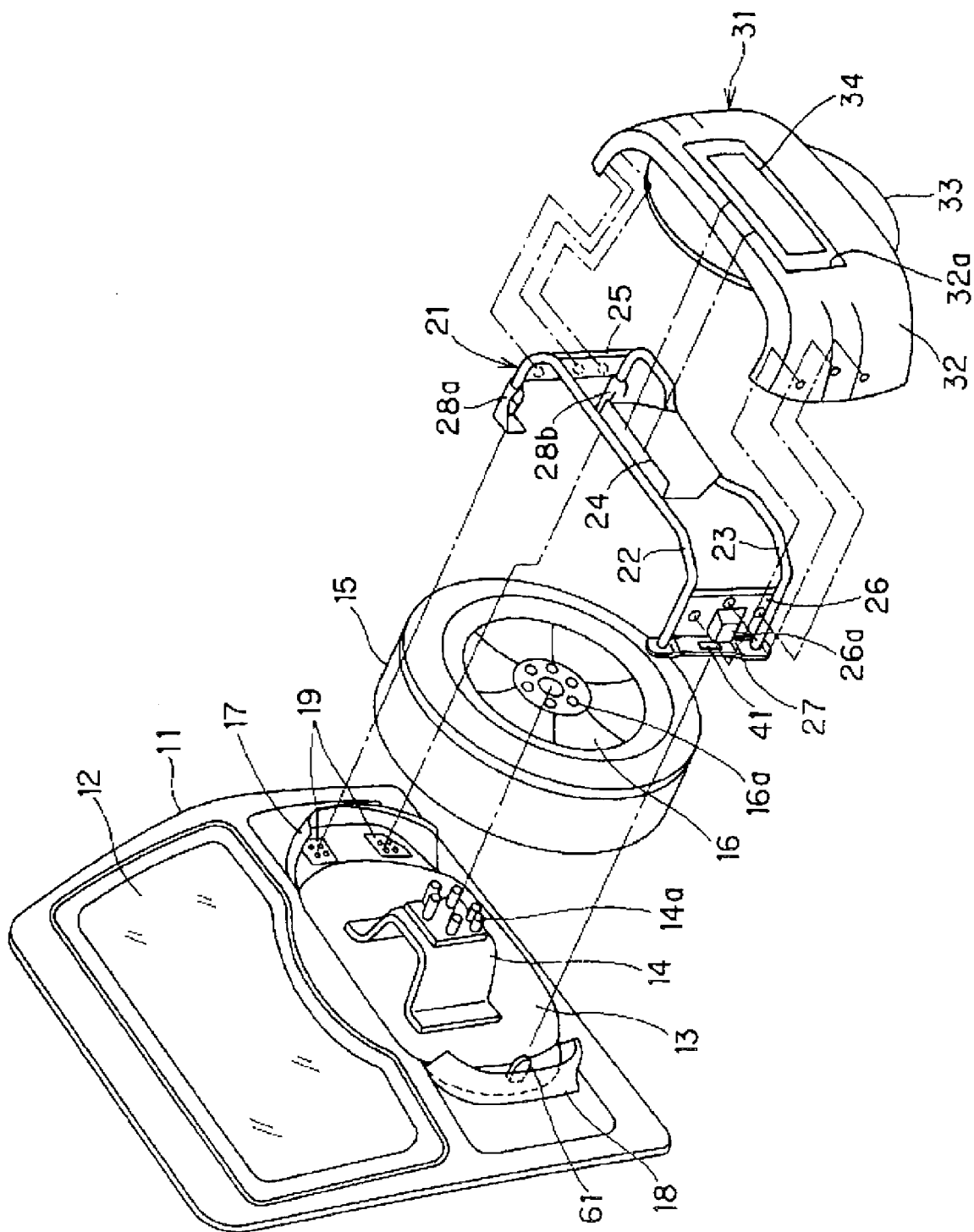


FIG. 2

FIG. 3

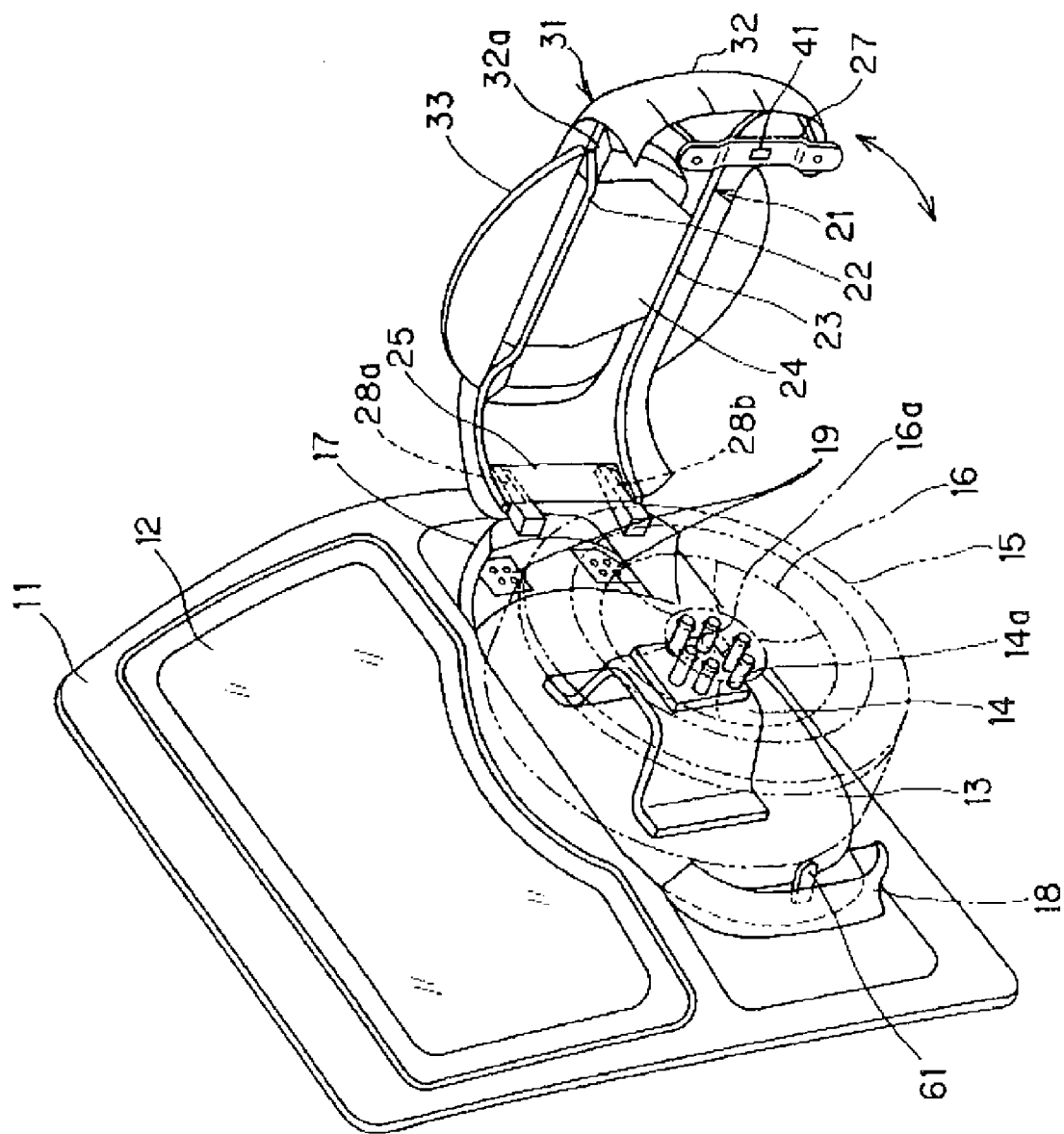


FIG. 4

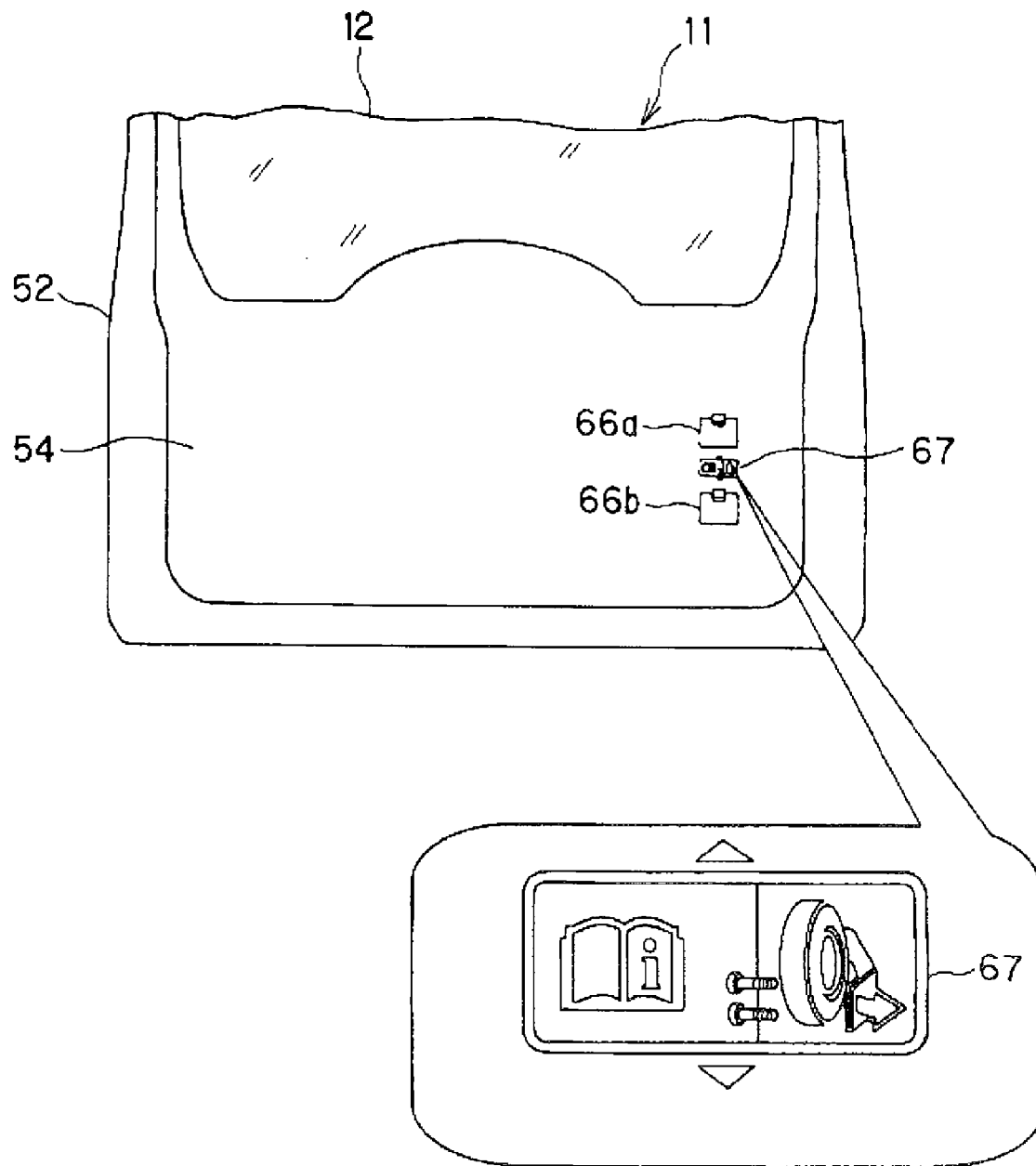
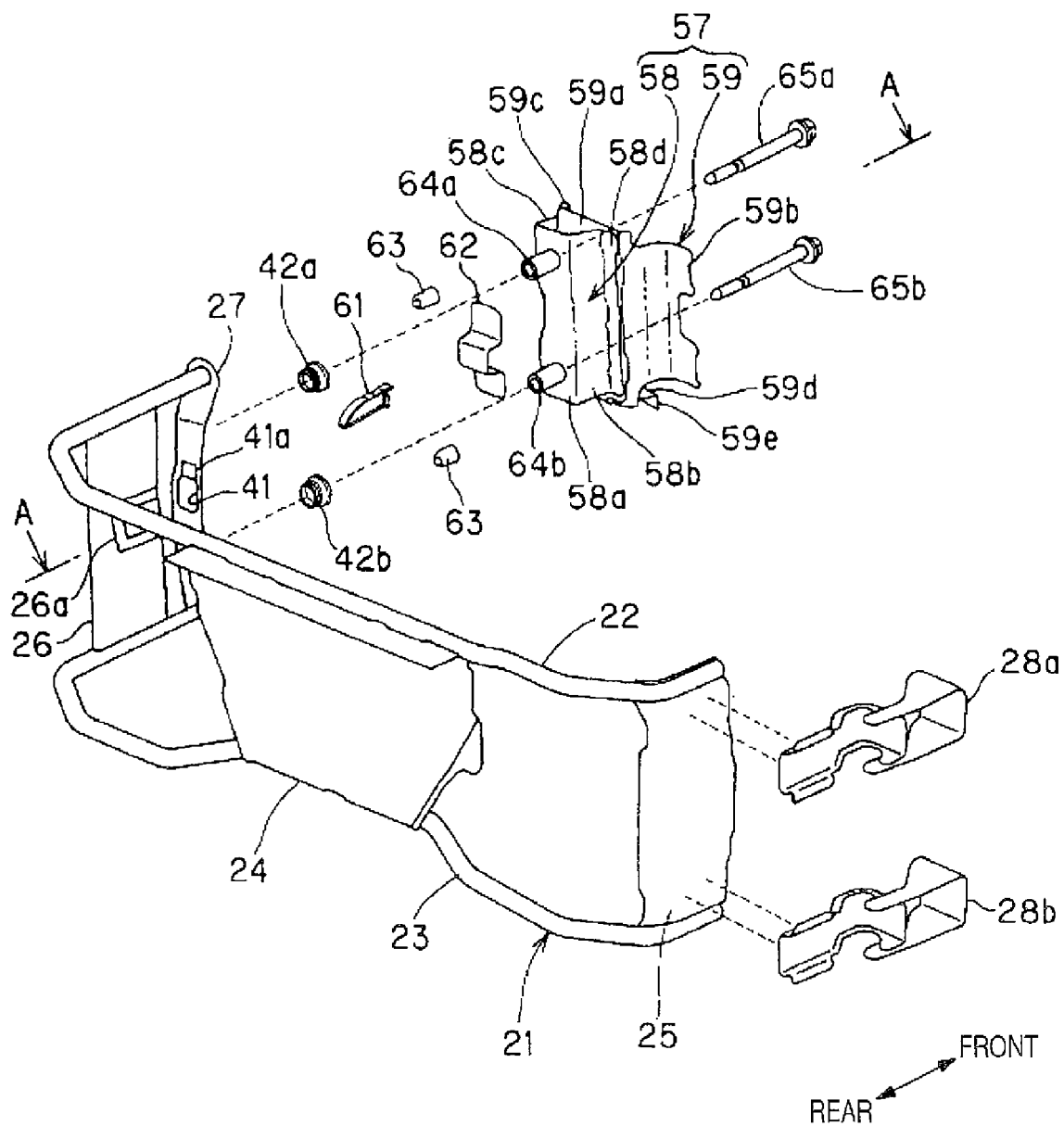


FIG. 5



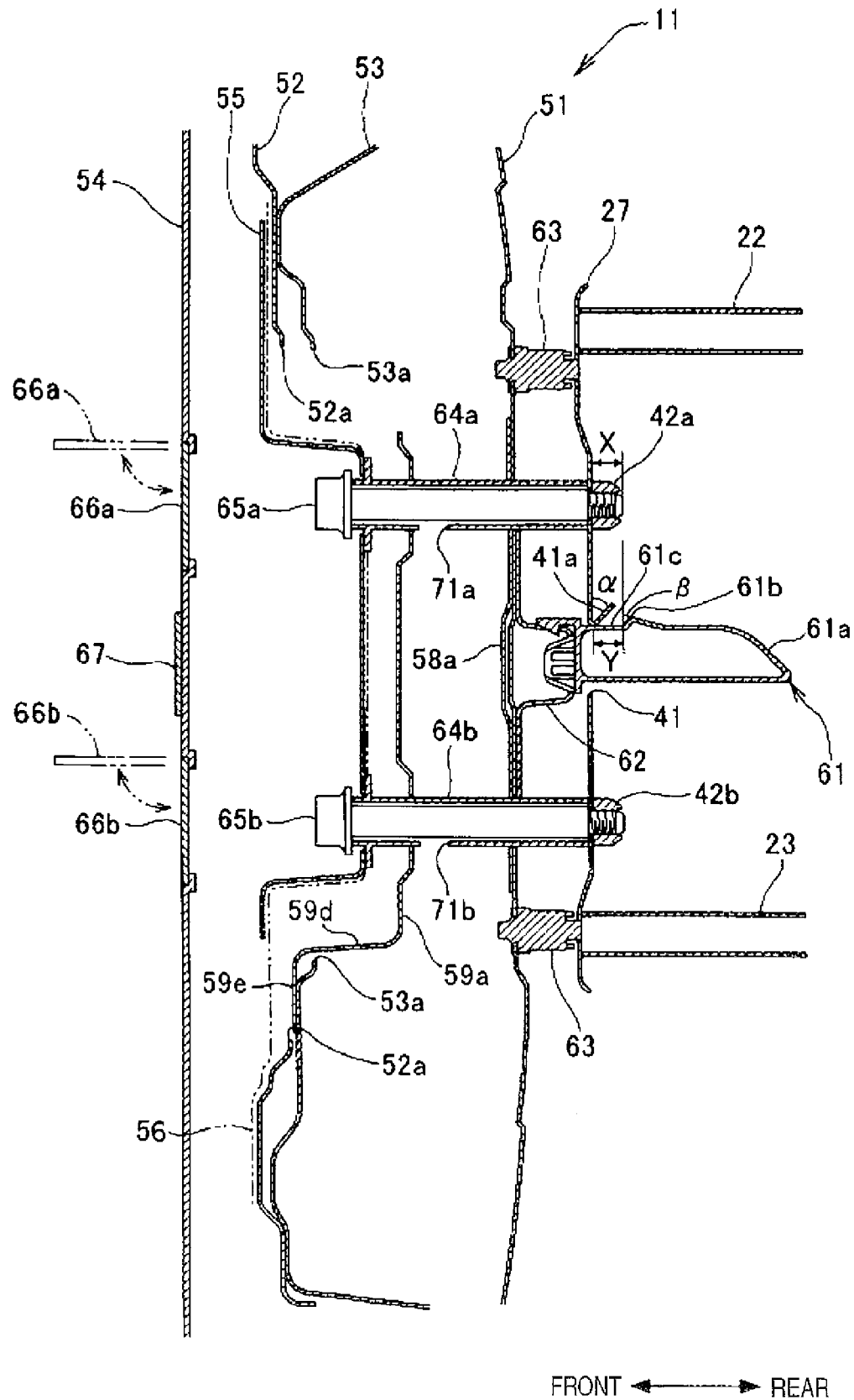


FIG. 7

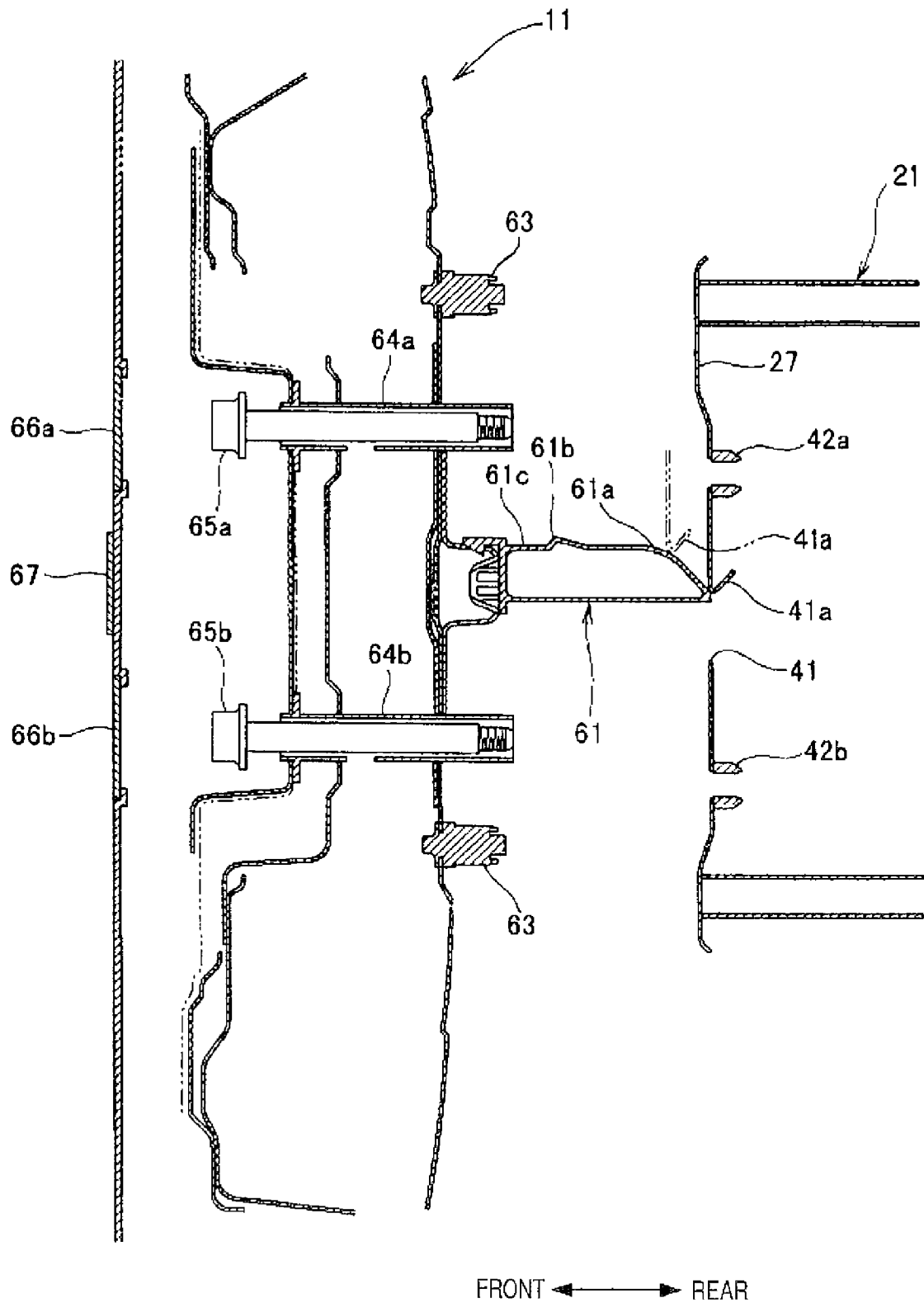


FIG. 8

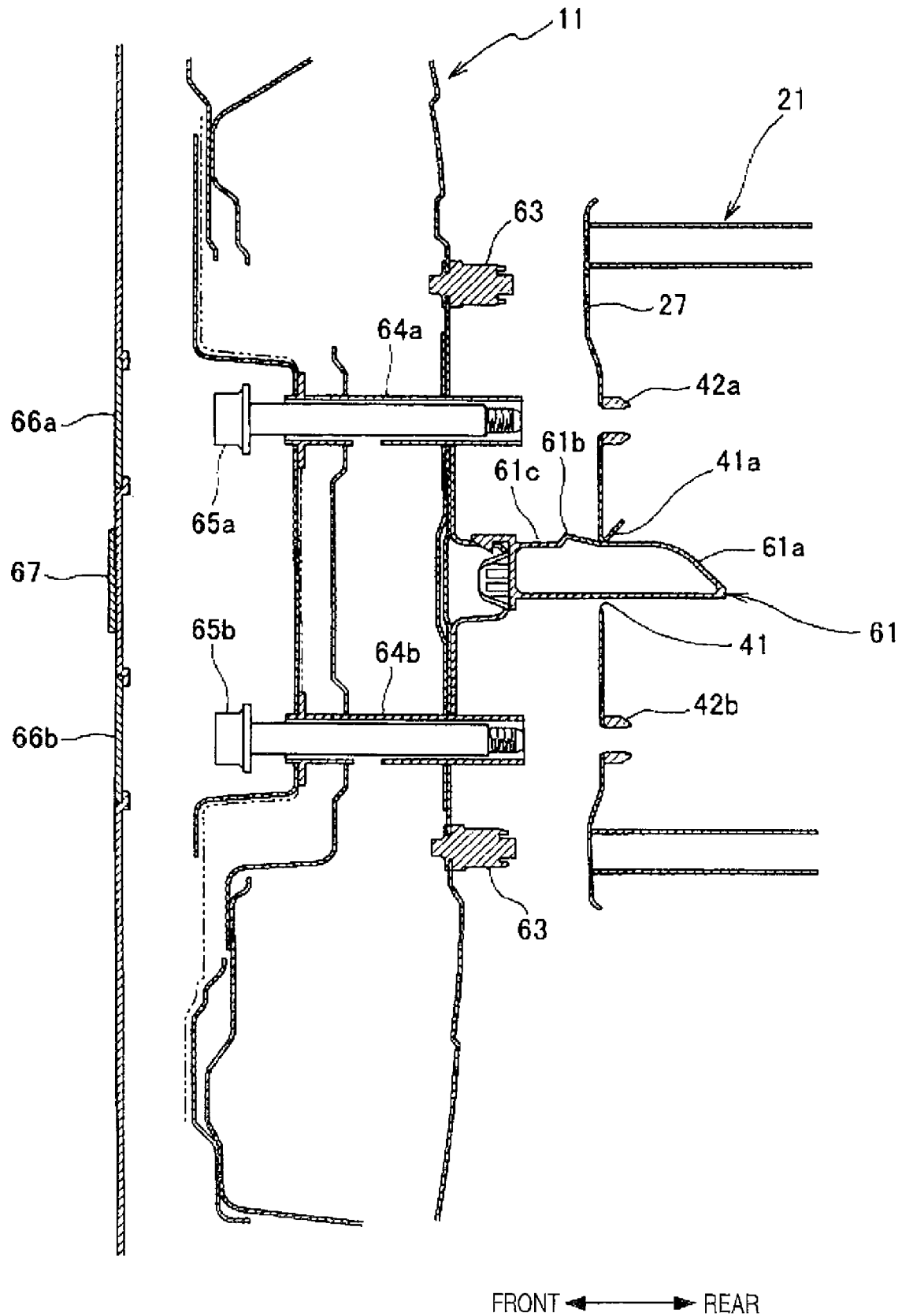


FIG. 9

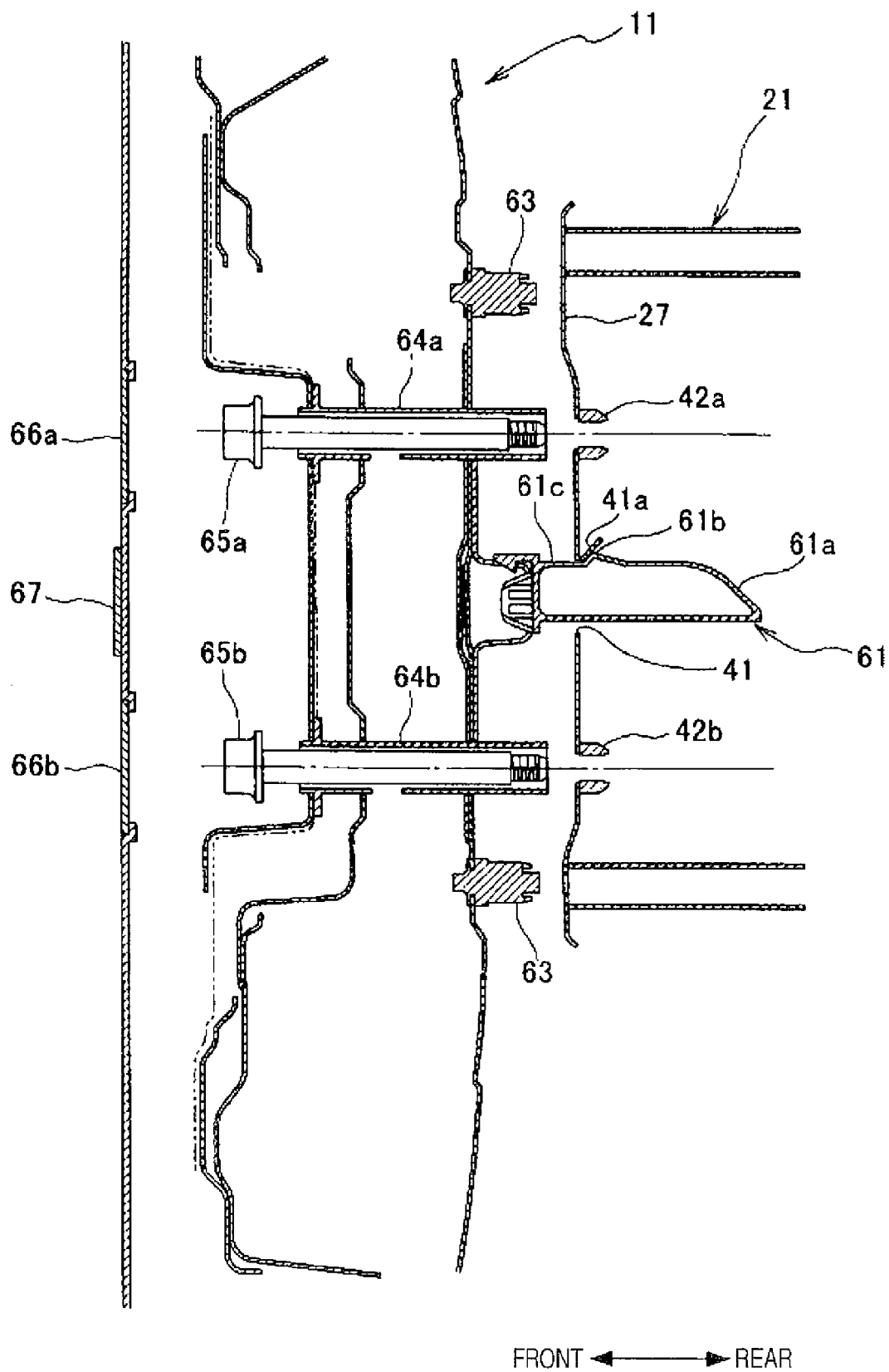
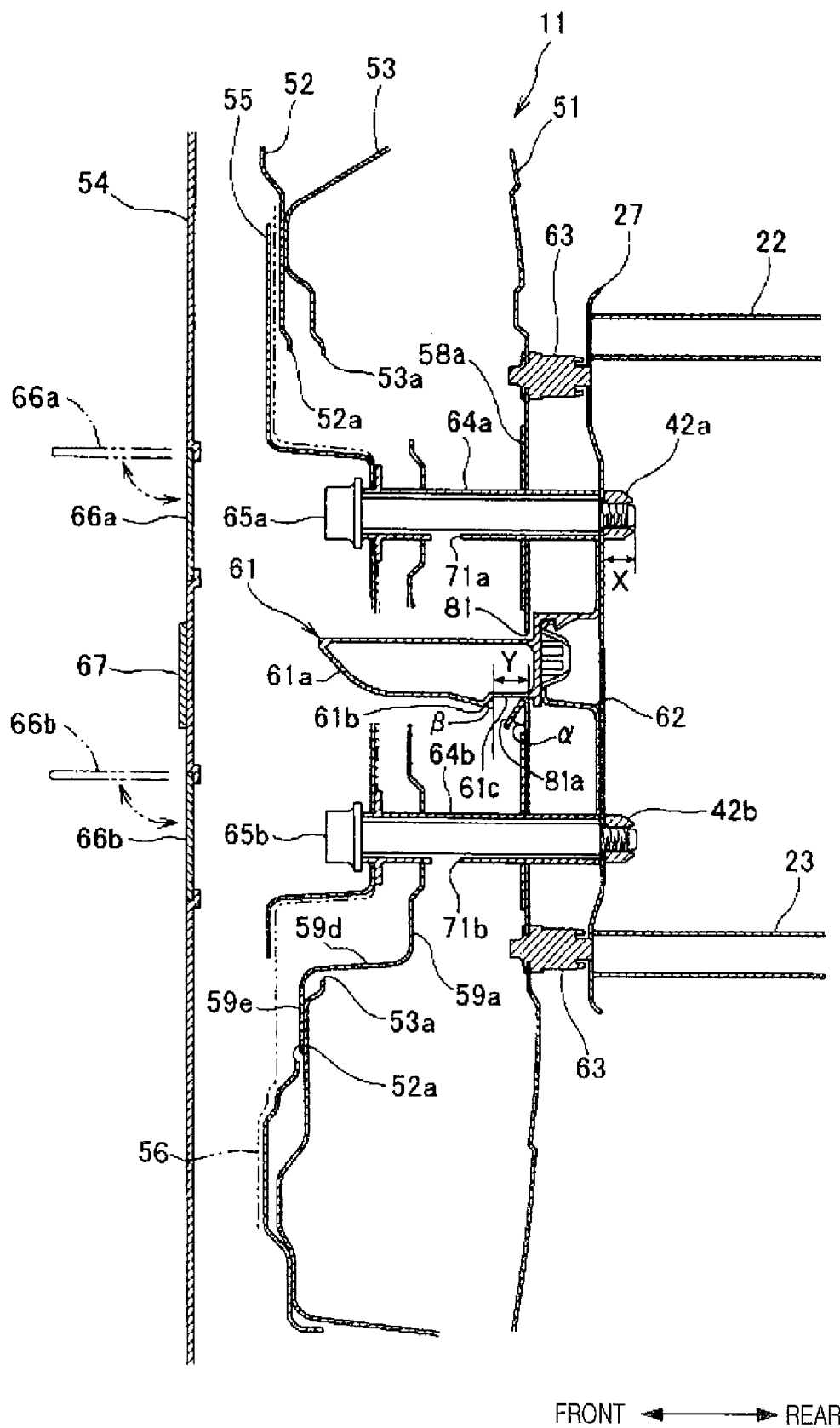


FIG. 11



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**SPARE TIRE COVER SUPPORTING
STRUCTURE****BACKGROUND OF THE INVENTION****1. Field of the Invention**

The present invention relates to a spare tire cover supporting structure.

2. Description of the Related Art

For example, in vehicles such as multipurpose four-wheel drive vehicles, there are some models in which an emergency spare tire is installed on an outer surface of a transverse rear door (tailgate door) in an exposed state with a view to not only improving the external appearance of the vehicle but also effectively making use of a space within a passenger compartment thereof. In addition, in those models, there are some vehicles in which the spare tire installed in the exposed state is covered with a spare tire cover such as a soft cover or a cover made of resin with a view to realizing a further improvement in external appearance and protection of the tire against theft.

In addition, in the vehicles provided with the spare tire cover, one end side of the spare tire cover is rotatably supported on the transverse rear door via rotary units such as hinges, while the other end side thereof is detachably supported by employing a lock mechanism including bolts and nuts. Consequently, the spare tire cover can be removed by operating the lock mechanism, thereby making it possible to facilitate the attachment and detachment of the spare tire.

The related spare tire cover supporting structure like this is disclosed in, for example, JP-A-11-192900.

With the related spare tire cover supporting structure described above, however, when the locking of the spare tire cover is released, the other end of the spare tire cover falls by the weight of the spare tire cover. As a result, it becomes difficult to position the bolts and the nuts of the lock mechanism when locking the spare tire cover, and this has resulted in a fear that the workability is deteriorated.

In addition, being different from the related structure described above in which the spare tire cover is rotated vertically, in a tire cover supporting structure in which a spare tire cover is rotated in a transverse direction of the vehicle, furthermore, when locking of the spare tire cover is released, the spare tire cover naturally rotates outwards from the weight of the spare tire cover at the same time that bolts of the lock mechanism are removed from corresponding nuts.

In recent years, in vehicles provided with spare tire covers, there are some vehicles in which a license plate is installed on an outer surface of the spare tire cover, and in conjunction with this, the installation of a license plate lamp for illuminating the license plate in the dark on the spare tire cover has been in increase. Furthermore, since the spare tire cover is disposed at a rear end of the vehicle, there is a case where electrical equipment such as a rearview monitor and a rear fog lamp is selectively mounted as an option. Consequently, the weight of the spare tire cover varies depending on the option selected, and hence, the falling amount of the other end of the spare tire cover also becomes inconsistent. As is understood from these facts, it is considered that the weight of spare tire covers will be increased more and more in the future and the falling amount at the other end of the spare tire cover varies vehicle from vehicle.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide a spare tire cover supporting structure which can realize an increase in workability and prevention of danger that would otherwise be produced.

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In order to achieve the object, according to the invention, there is provided a spare tire cover supporting structure comprising:

- a transverse rear door, provided on a vehicle;
- a spare tire cover, including a first end and a second end, the first end supported on the transverse rear door, the spare tire cover operable to cover a spare tire held on the transverse rear door;
- a mounting member, detachably mounting the second end on the transverse rear door; and
- a supporting member, provided on one of the transverse rear door and the second end of the spare tire cover, wherein when the second end of the spare tire cover is mounted on the transverse rear door by the mounting member or the second end of the spare tire cover is detached from the transverse rear door, the supporting member positions the spare tire cover relative to the transverse rear door and restricts an opening movement of the spare tire cover.

An engagement portion adapted to be brought into engagement with the supporting member may be provided on the other of the transverse rear door and the second end of the spare tire cover. The supporting member may include: a guide portion, including a slope for guiding the engagement portion; and a projecting portion, projecting in a first direction which is perpendicular to a direction of the opening movement of the spare tire cover.

The engagement portion may include a bent piece which is formed by bending a surface of the other of the transverse rear door and the second end of the spare tire cover, and the bent piece may have a first angle relative to the first direction. The projecting portion may include an inclined portion which can be brought into abutment with the bent piece, and the inclined portion may have a second angle relative to the first direction. The first angle may be smaller than the second angle.

The mounting member may lock the second end of the spare tire cover on the transverse rear door. When locking by the mounting member is released, the projecting portion may restrict the opening movement of the spare tire cover.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a rear perspective view of a vehicle provided with a spare tire cover supporting structure according to one embodiment of the invention.

FIG. 2 is an exploded rear perspective view of the spare tire cover supporting structure.

FIG. 3 is a rear perspective view showing a condition in which a spare tire cover is in an open state.

FIG. 4 is an explanatory drawing showing an inner surface of a transverse rear door.

FIG. 5 is an exploded perspective view of the spare tire cover supporting structure according to the embodiment of the invention.

FIG. 6 is a sectional view taken along the line A-A and viewed in a direction indicated by arrows A in FIG. 5.

FIG. 7 is a sectional view showing a state in which an engagement portion moves along a slope portion during a closing movement.

FIG. 8 is a sectional view showing a state in which the engagement portion moves to an apex of the slope portion during the closing movement.

FIG. 9 is a sectional view showing a state in which the engagement portion rides over a raised portion during the closing movement.

FIG. 10 is a sectional view showing a state in which the engagement portion moves over a planar portion during the closing movement.

FIG. 11 is a side sectional view of a spare tire supporting structure according to another embodiment of the invention.

DETAIL DESCRIPTION OF THE INVENTION

Hereinafter, a spare tire supporting structure of the invention will be described in detail by employing the accompanying drawings.

As is shown in FIGS. 1 to 3, a transverse rear door 11 is provided rotatably on a rear end face of a vehicle 1 via transverse rear door hinges, not shown. A transverse rear door glass 12 is fitted in an upper portion of the transverse rear door 11, while a circular spare tire mounting surface 13 is formed below the transverse rear door glass 12 in a substantially central portion on the transverse rear door 11 in a transverse direction of the vehicle. In addition, a bracket 14, which is formed into a raised shape, is formed in a substantially central portion of the spare tire mounting surface 13, so that a spare tire 15 is mounted on the bracket 14.

A wheel 16 is fitted in the spare tire 15, and a plurality of hub bolt holes 16a are formed in this wheel 16. On the other hand, a plurality of mounting bolts 14a are provided on a top surface portion of the raised bracket 14 in such a manner as to correspond to the hub bolt holes 16a, respectively. Namely, with an outer surface of the wheel 16 oriented towards the rear of the vehicle, the mounting bolts 14a and the hub bolt holes 16a are disposed in such a manner as to face each other, and mounting nuts, not shown, are mounted on the mounting bolts 14a which have now passed through the hub bolt holes 16a, whereby the spare tire 15 can be fixed on to the bracket 14.

Door-side covers 17, 18, which are made of resin, are provided on both sides of the spare tire mounting surface 13 in the transverse direction. In addition, mounting seats 19 are formed on the spare tire mounting surface 13 inside of the door-side cover 17 in the transverse direction, while a holder 61, which will be described later, is provided on the spare tire mounting surface 13 inside of the door-side cover 18 in the transverse direction.

A spare tire cover supporting body 21 is provided on an outer side of the spare tire 15. The spare tire cover supporting body 21 includes frames 22, 23, which make up a framework, reinforcement members 24, 25, 26 which reinforce the frames 22, 23 and a mounting plate 27.

The frames 22, 23 are provided in parallel in a vertical direction and are provided in such a manner as to surround the spare tire 15 in a horizontal direction. In addition, substantially intermediate portions in a longitudinal direction of the frames 22, 23 are coupled to each other by the reinforcement member 24, while the frames 22, 23 are coupled to each other by the reinforcement 25 at one ends thereof and by the reinforcement member 26 at the other ends thereof (left ends as viewed from the rear of the vehicle). Furthermore, distal ends of the frames 22, 23 at the other ends thereof are coupled to each other by the mounting plate 27. Note that in this embodiment, the reinforcement members 24, 25, 26 and the mounting plate 27 are such as to be pressed into plate shapes from a sheet steel.

Additionally, a pair of upper and lower hinges 28a, 28b are supported, respectively, at an upper end and a lower end of the reinforcement member 25, which lies on the right-hand side as viewed from the rear of the vehicle, at distal ends thereof, and proximal ends of the respective hinges 28a, 28b are mounted on the mounting seats 19, respectively. On the other hand, a swelling portion 26a is formed on the reinforcement member 26, which lies on the left-hand side as viewed from

the rear of the vehicle, in such a manner as to swell outwards in the transverse direction and to be opened on a side facing the front of the vehicle.

A spare tire cover 31 made of resin is provided on an outer side of the spare tire cover supporting body 21. The spare tire cover 34 includes a cover main body 32 and a circular portion 33 which is formed integrally on the cover main body 32. The cover main body 32 takes a rectangular shape and is formed in such a manner that both transverse ends thereof are bent towards the front of the vehicle. In addition, the circular portion 33 is formed into a circular shape which is diametrically slightly smaller than the spare tire 15. Namely, the spare tire cover 31 holds the spare tire 15 mounted from both sides thereof and covers the spare tire 15 in such a manner as to conceal the wheel 16. In addition, a recessed portion 32a is formed on an outer surface of the cover main body 32, and a license plate 34 is provided in this recessed portion 32a.

Next, a spare tire supporting structure will be described by employing FIGS. 4 to 6.

As is shown in FIGS. 5, 6, an engagement hole 41 is formed on the mounting plate 27 of the spare tire cover supporting body 21 in such a manner as to open in a substantially intermediate portion in a longitudinal direction thereof, and a bent piece 41a which is bent towards the rear of the vehicle is formed at an upper end of the engagement hole 41. In addition, the bent portion 41a of the engagement hole 41 forms an angle α relative to a surface direction (a vertical direction) of the mounting plate 27. In addition, nuts 42a, 42b are provided integrally with the mounting plate 27 above and below the engagement hole 41 in the mounting plate 27, respectively.

On the other hand, the transverse rear door 11 includes an outer panel 51, an inner panel 52, which is disposed further inwards than the outer panel 51, a reinforcement 53, which is joined to an outer surface of the inner panel 52 so as to reinforce the inner panel 52, and a door trim 54, which is disposed further inwards than the inner panel 52.

A bracket 62, which is formed into a raised shape, is mounted on an outer surface of the outer panel 51, and the holder 61 is supported on a top surface portion of the bracket 62. The holder 61 is formed into a knife shape and has, on an upper surface thereof, a slope portion 61a which slopes moderately as it extends towards its distal end, a raised portion 61b which projects upwards (in a direction which is vertical to a direction in which the spare tire 31 and the spare tire cover supporting body 21 are operated to be opened and closed) in a position lying further proximal than the slope portion 61a, and a planar portion 61c which is formed in a position lying further proximal than the raised portion 61b.

Here, a restricting inclination angle which is formed by an inclined surface of the raised portion 61b of the holder 61 which lies on a proximal side of the raised portion 61b and a perpendicular drawn relative to the holder 61 forms an angle β , and a relationship of $\alpha \leq \beta$ is established between the afore-said bent-back angle α and the restricting inclination angle β . In addition, the planar portion 61c of the holder 61 is formed to extend over a length Y from a proximal end of the raised portion 61c.

In addition, the holder 61 is passed through the engagement hole 41 in the mounting plate 27 on the spare tire cover supporting body 21 side in such a state that the spare tire cover is closed, and an upper edge portion of the engagement hole 41, which is a bent portion of the bent piece 41a, is brought into abutment with the upper surface of the holder 61. In addition, dampers 63, which are formed of rubber or the like, are provided, respectively, above and below the holder 61 on the outer panel 51.

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Working holes **52a**, **53a** are formed in the inner panel **52** and the reinforcement **53**, respectively. These working holes **52a**, **53a** are holes which are used, for example, when mounting a door latch or the like inside the transverse rear door **11**. A support plate **55** is disposed inwards of the working holes **52a**, **53a**, and this support plate **55** is joined to an inner surface of the inner panel **52** via a waterproof film **56**. Namely, the waterproof film **56** is affixed thereto in such a manner as to cover the working holes **52a**, **53a** from the inside. In addition, a supporting body **57** having a closed cross-sectional construction is disposed within the working hole **53a** in such a manner as to face the holder **61**, and this supporting body **57** includes an outer bracket **58** and an inner bracket **59** whose cross sections take groove shapes.

The outer bracket **58** includes a top surface portion **58a**, side walls **58b**, **58c**, which connect to the top surface portion **58a**, and a flange portion **58d**, which is formed along a distal end of the side wall **58b**. On the other hand, the inner bracket **59** includes a top surface portion **59a**, a curved wall **59b**, which connects to the top surface portion **59a**, a side wall **59c**, a lower wall **59d** and a flange portion **59e**, which is formed along a distal end of the lower wall **59d**.

The outer bracket **58** and the inner bracket **59** are integrated with each other by connecting together the flange portion **58a** of the outer bracket **58** and the top surface portion **59a** of the inner bracket **59** and joining together the side wall **58c** of the outer bracket **58** and the side wall **59c** of the inner bracket **59**. Namely, since the outer bracket **58** and the inner bracket **59** are joined together in such a manner that the opening of the outer bracket **58** is covered by the top surface portion **59a** of the inner bracket **59**, the supporting body **57** is allowed to have the closed cross sectional construction, the rigidity thereof being thereby increased.

Furthermore, the supporting body **57**, which is joined in the way described above, is joined between the outer panel **51** and the reinforcement **53** through the connection of the top surface portion **58a** of the outer bracket **58** with the holder **61** via the outer panel **59** and the bracket **62** and connection of the curved wall **59b** and the flange portion **59e** of the inner bracket **59** with the reinforcement **53**.

Pipes **64a**, **64b** are supported between the outer panel **51**, the supporting plate **55**, the waterproof film **56**, the top surface portion **58a** of the outer bracket **58** and the top surface portion **59a** of the inner bracket **59** in such a manner as to pass therethrough. The pipes **64a**, **64b** are provided in such a manner as to face the nuts **42a**, **42b**, respectively. Bolts **65a**, **65b** are passed through interiors of the pipes **64a**, **64b**, respectively, so that externally threaded portions of the bolts **65a**, **65b** are fittingly screwed into internally threaded portions in the nuts **42a**, **42b**, respectively, whereby the spare tire cover supporting body **21** is supported on the transverse rear door **11** side. Namely, the nuts **42a**, **42b**, the pipes **64a**, **64b** and the bolts **65a**, **65b** make up the lock mechanism. Here, a length X over which the bolts **65a**, **65b** project from distal ends of the pipes **64a**, **64b** when the bolts **65a**, **65b** lying in the pipes **64a**, **64b** are fittingly screwed into the nuts **42a**, **42b**, respectively, is made to be substantially the same length as the length Y of the planar portion **61c** of the holder **61**.

In addition, discharge holes **71a**, **71b** are formed in the pipes **64a**, **64b**, respectively, in such a manner as to open downwards. The discharge holes **71a**, **71b** are disposed in positions on the pipes **64a**, **64b** which lie between the outer panel **51** and the inner panel **52**, that is, further outwards than the waterproof film **56**.

As is shown in FIGS. **4**, **6**, lids **66a**, **66b** are mounted on the door trim **54** in positions which face the pipes **64a**, **64b**, respectively, in such a manner as to be able to approach the

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bolts **65a**, **65b**, respectively. An indication plate **67** is provided between the lids **66a**, **66b**, and this indication plate **67** indicates thereon graphics of the spare tire **15**, the spare tire cover **31** and the bolts **65a**, **65b**.

Consequently, by configuring the spare tire supporting structure in the way that has been described heretofore, the spare tire cover **31**, which is integrated with the spare tire cover supporting body **21**, is opened and closed relative to the spare tire **15** which is mounted on the transverse rear door **11** by rotating the spare tire cover supporting body **21** in the transverse direction. Then, the spare tire **15** can be mounted or dismounted in such a state that the spare tire cover is opened. The opening and closing operations of the spare tire cover **31** are carried out in such a manner that the bolts **65a**, **65b** are loosened to be removed from the nuts **42a**, **42b**, respectively, so as to unlock the spare tire cover **31**, whereby the spare tire cover is put into an open state, the spare tire cover **31** is locked to be put into a closed state by tightening the bolts **65a**, **65b** into the nuts **42a**, **42b**, respectively.

Next, a detaching operation for detaching a rotational end of the spare tire cover **31** from the transverse rear door **11** will be described by employing FIGS. **6** to **10**.

Firstly, when mounting the rotational end of the spare tire cover **31** on the transverse rear door **11**, as is shown in FIG. **7**, the spare tire cover supporting body **21** is operated to be closed. As this occurs, since weights of the spare tire cover **31**, the license plate **34** and electrical equipment (for example, a license plate lamp, a rearview monitor, a rear fog lamp and the like) are applied to the spare tire cover supporting body **21** in addition to its own weight, a rotational end (the other end) side of the spare tire cover supporting body **21** falls, resulting in a state that the spare tire cover **31** is inclined. When the spare tire cover supporting body **21** is rotated in this state, the upper edge portion of the engagement hole **41** is brought into abutment with the distal end of the slope portion **61a** of the holder **61**.

When the spare tire cover supporting body **21** is rotated further, the engagement hole **41** ascends along the slope portion of the holder **61**, as is shown by chain double-dashed lines in FIG. **7**. Then, as is shown in FIG. **8**, when the upper edge portion of the engagement hole **41** reaches an apex of the slope portion **61a** of the holder, the rotational end side of the spare tire cover supporting body **21** also ascends, whereby the spare tire cover supporting body **21** comes to be held in a substantially horizontal state, the inclination of the spare tire cover **31** being thereby modified.

In addition, when the spare tire cover supporting body **21** is rotated further, the upper edge portion of the engagement holder **41** rides over the raised portion **61b** of the holder **61** to eventually arrive at the planar portion **61c**, as is shown in FIG. **9**. As this occurs, the bent piece **41a** comes into abutment with a surface of the raised portion **61b** which lies on the proximal end side of the holder **61**, whereby, the rotation of the spare tire cover supporting body **21** in the opening direction is restricted, and the upper edge portion of the engagement hole **41** is temporarily held on the planar portion **61c** of the holder **61**. In addition, when the upper edge portion of the engagement hole **41** moves on to the planar portion **61c** of the holder **61**, the nuts **42a**, **42b** and the pipes **64a**, **64b** are axially aligned (positioned) with each other, respectively, whereby the nuts **42a**, **42b** and the pipes **64a**, **64b** are disposed coaxially.

Then, as is shown in FIG. **10**, when the upper edge portion of the engagement hole **41** moves as far as a proximal end of the planar portion **61c**, the mounting plate **27** comes into abutment with the dampers **63** so as to absorb impacts, and in

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conjunction with this, the nuts **42a**, **42b** and the pipes **64a**, **64b** are opposed to each other, respectively.

Following this, as is shown in FIG. 6, the bolts **65a**, **65b**, which are accommodated in advance in the pipes **64a**, **64b**, respectively, are tightened into the nuts **42a**, **42b** by employ-
ing a wrench or the like which is inserted by opening the lids **66a**, **66b**, whereby the spare tire cover supporting body **21** is locked, the spare tire cover **31** being put into a closed state relative to the transverse rear door **11**.

On the other hand, when detaching the rotational end of the spare tire cover **31** from the transverse rear door **11**, the bolts **65a**, **65b** are loosened to be removed from the corresponding nuts **42a**, **42b** by employing the wrench or the like, as is shown in FIG. 10, whereby the spare tire cover supporting body **21** is released from the locked state.

Here, as has been described above, since the weights of the spare tire cover **31**, the license plate **34** and electrical equipment (for example, a license plate lamp, a rearview monitor, a rear fog lamp and the like) are applied to the spare tire cover supporting body **21** in addition to its own weight, the upper edge of the engagement hole **41** slides over the holder **61** at the same time that the lock is so released, resulting in a fear that the spare tire cover **31** naturally opens. However, even though the rotation of the spare tire cover supporting body **21** in the opening direction occurs, since the bent piece **41a** of the engagement hole **41** is brought into abutment with the surface of the raised portion **61c** of the holder **61** which lies facing the proximal end side of the holder **61**, as is shown in FIG. 9 the opening movement of the spare tire cover supporting structure **21** is restricted, and the upper edge portion of the engagement hole **41** is temporarily held on the planar portion **61c** of the holder **61**.

Then, when the spare tire cover supporting body **21** is rotated, the upper edge portion of the engagement hole **41** rides over the raised portion **61a** of the holder **61** to thereby be shifted on to the slope portion **61a**, as is shown in FIG. 8. Next, as is shown in FIG. 7, the engagement hole **41** descends along the slope portion **61a** of the holder **61** and, thereafter, moves apart from the holder **61**, whereby the spare tire cover **31** is put into an open state relative to the transverse rear door **11**.

Note that since the mounting plate **27** side of the spare tire cover supporting body **21** falls when the spare tire cover supporting body **21** rotates, a large load is caused to act on the holder **61** via the engagement hole **41**. However, since the holder **61** is supported by the supporting body **57** having the closed cross sectional construction whose rigidity is increased, deformation or failure of the holder **61** is prevented. In addition, since the bent piece **41a** of the engagement hole **41** is formed to be bent and the curved portion, which is the portion which is so bent, moves over the upper surface of the holder **61**, the generation of friction is suppressed, a smooth movement being thereby enabled.

Since the pipes **64a**, **64b** are also passed through and supported on the supporting body **57**, the deformation or failure of the pipes **64a**, **64b** due to hard tightening of the bolts **65a**, **65b** are prevented. In addition, since the discharge holes **71a**, **71b** are formed in the pipes **64a**, **64b**, respectively, even though water such as rain water or washing water intrudes into the pipes **64a**, **64b** in such a state that the spare tire cover is kept open, the water that has so intruded is then discharged from the discharge holes **71a**, **71b** to the outside of the vehicle.

Since the pipes **64a**, **64b** are also passed through and supported on the supporting body **57**, the deformation or failure of the pipes **64a**, **64b** due to hard tightening of the bolts **65a**, **65b** are prevented. In addition, since the discharge holes **71a**,

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71b are formed in the pipes **64a**, **64b**, respectively, even though water such as rain water or washing water intrudes into the pipes **64a**, **64b** in such a state that the spare tire cover is kept open, the water that has so intruded is then discharged from the discharge holes **71a**, **71b** to the outside of the vehicle.

By making the relationship between the bent-back angle α and the restricting inclination angle β be $\alpha \leq \beta$, the restricting force by the raised portion **61c** during the opening movement and closing movement of the spare tire cover supporting body **21** is controlled by adjusting the magnitude of the restricting inclination angle β .

Since the length X over which the bolts **65a**, **65b** projects from the distal ends of the pipes **64a**, **64b** when the bolts **65a**, **65b** are fittingly screwed into the nuts **42a**, **42b** and the length Y of the planar portion **61c** are formed substantially the same, the upper edge of the engagement hole **41** is disposed on the planar portion **61c** of the holder **61** when the bolts **66a**, **65b** are mounted on the nuts **42a**, **42b**, respectively, or when the bolts **66a**, **65b** are removed from the nuts **42a**, **42b**, respectively, whereby the bent piece **41a** of the engagement hole **41** is made to receive the restricting force by the raised portion **61b** of the holder **61**, and hence, no chance occurs where the spare tire cover supporting body **21** opens on its own by opposing the intention of the worker, thereby making it possible to facilitate one-man work.

Since the graphics of the spare tire **15**, the spare tire cover **31**, and the bolts **65a**, **65b** are indicated on the indicator plate **67**, the worker can easily recognize that a spare tire replacement can be done by opening the lids **66a**, **66b**.

In addition, in the spare tire cover supporting structure that has been described heretofore, while the configuration is adopted in which the holder **61** is provided on the transverse rear door **11** side, whereas the engagement hole **41** is provided on the spare tire cover supporting body **21** side, the configuration of the invention is not limited thereto. Namely, as is shown in FIG. 11, a configuration may be adopted in which an engagement hole **81** is provided on the transverse rear door **11** side, whereas the holder **61** is provided on the spare tire cover supporting body **21** side.

As is shown in FIG. 11, the holder **61** is supported on the mounting plate **27** of the spare tire cover supporting body **21** via the bracket **62**. As this occurs, the holder **61** is provided in such a way that the slope portion **61a**, the raised portion **61b** and the planar portion **61c** make up the lower surface of the holder **61**. On the other hand, the engagement hole **81** is formed in the outer panel **51** of the transverse rear door **11**, and a bent piece **81a** is formed at a lower end of the engagement hole **81** in such a manner as to be bent towards the front of the vehicle.

Here, the bent piece **81a** of the engagement hole **81** and the outer panel **51** form an angle α therebetween. In addition, a restricting inclination angle formed by an inclined surface of the holder **61** which lies on a proximal side of the raised portion **61b** and a perpendicular drawn relative to the holder **61** form an angle β . In addition, a relationship of $\alpha \leq \beta$ is established between the aforesaid bent-back angle α and the restricting inclination angle β . Consequently, the function and advantage of the invention can also be provided by the configuration like this.

Consequently, according to the spare tire cover supporting structure according to the invention, even though the rotational end side of the spare tire cover supporting body **21** falls due to the weights of the spare tire cover supporting body **21**, the spare tire cover **31**, the license plate **34**, the electrical equipment and the like when the spare tire cover is mounted, since the upper edge portion of the engagement hole **41** is

allowed to move along the planar portion **61c** from the slope portion **61a** of the holder **61**, the nuts **42a**, **42b** on the spare tire cover supporting body **21** side and the pipes **64a**, **64b** on the transverse rear door **11** side can be made to be disposed coaxially, respectively. In addition, since the shift of the bent piece **41a** of the engagement hole **41** in the opening direction can be restricted by the raised portion **61b** of the holder **61** and the upper edge portion of the engagement hole **41** can be temporarily held on the planar portion **61c**, the tightening of bolts **65a**, **65b** into the nuts **42a**, **42b** can be facilitated. As a result, the workability is increased, thereby making it possible to facilitate the mounting of the spare tire cover **31**.

On the other hand, when the spare tire cover is removed, even though the rotation of the spare tire cover supporting body **21** in the opening direction occurs due to the weights described above, since the raised portion **61b** of the holder **61** can restrict the movement of the bent piece **41a** of the engagement hole **41**, danger to the surroundings by the natural opening of the spare tire cover **31** can be prevented.

In addition, with the relationship between the bent-back angle α and the restricting inclination angle β made to be $\alpha \leq \beta$, the restricting force of the raised portion **61b** during opening and closing movements of the spare tire cover supporting body **21** can easily be controlled by adjusting the magnitude of the restricting inclination angle β .

In addition, since the length X over which the bolts **65a**, **65b** projects from the distal ends of the pipes **64a**, **64b** when the bolts **65a**, **65b** are fittingly screwed into the nuts **42a**, **42b** and the length Y of the planar portion **61c** are formed substantially the same, the upper edge of the engagement hole **41** is disposed on the planar portion **61c** of the holder **61** when the bolts **66a**, **65b** are mounted on the nuts **42a**, **42b**, respectively, or when the bolts **66a**, **65b** are removed from the nuts **42a**, **42b**, respectively, whereby the restricting force by the raised portion **61b** of the holder **61** can be made to act on the bent piece **41a** of the engagement hole **41**. As a result, no chance occurs where the spare tire cover supporting body **21** opens on its own by opposing the intention of the worker, thereby making it possible to facilitate one-man work.

Additionally, by supporting the holder **61** and the pipes **64a**, **64b** on the supporting body **57** which is provided in the interior of the transverse rear door **11** and which has the closed cross sectional construction, even though a large load is applied to the holder via the engagement hole **41**, the deformation or failure of the holder **61** can be prevented, and the deformation or failure of the pipes **64a**, **64b** due to the forced tightening of the bolts **65a**, **65b** thereinto can also be prevented.

Furthermore, the lids **66a**, **66b** are provided on the door trim **54** which faces the pipes **64a**, **64b** which accommodate therein the bolts **65a**, **65b**, respectively, in such a manner as to be opened and closed, and the indicator portion **67** which indicates graphics of the spare tire **15**, the spare tire cover **31** and the bolts **65a**, **65b** is provided in the vicinity of the lids **66a**, **66b**, thereby making it possible to show easily the worker how to perform spare tire replacement work.

According to the spare tire cover supporting structure according to the invention, the workability in mounting and dismounting the spare tire cover can be increased and danger can be prevented that would otherwise be caused to the periphery because of natural opening or opening by gravity of the spare tire cover.

The invention can be applied to a door which is supported rotatably at one end thereof.

What is claimed is:

1. A spare tire cover supporting structure, comprising:
 - a transverse door, provided on a vehicle;
 - a spare tire cover, including a first end and a second end, the first end supported on the transverse door, the spare tire cover operable to cover a spare tire held on the transverse door;
 - a mounting member attached to the second end of the spare tire cover, the mounting member detachably mounting the second end on the transverse door;
 - a supporting member, provided on one of the transverse door and the second end of the spare tire cover;
 - an engagement portion, provided on the other of the transverse door and the second end of the spare tire cover, configured to engage with the supporting member, such that when the engagement portion engages the supporting member, the supporting member positions the spare tire cover relative to the transverse door; and
 - a lock mechanism that selectively fixes the spare tire cover against the transverse door and releases the spare tire cover from the transverse door,
 wherein the supporting member has a projecting portion that makes contact with the engagement portion when the lock mechanism releases the spare tire cover from the transverse door and the spare tire cover moves in an opening direction by a predetermined amount, such that movement of the spare tire cover in the opening direction is restricted within the predetermined amount.
2. The spare tire cover supporting structure according to claim 1, wherein the transverse door is a transverse rear door.
3. The spare tire cover supporting structure according to claim 1, wherein
 - the supporting member includes a guide portion, including a slope for guiding the engagement portion, and
 - wherein the projecting portion projects in a first direction which is perpendicular to the opening direction.
4. The spare tire cover supporting structure according to claim 3, wherein
 - the engagement portion includes a bent piece which is formed by bending a surface of the other of the transverse door and the second end of the spare tire cover, and the bent piece has a first angle relative to the first direction,
 - the projecting portion includes an inclined portion which can be brought into abutment with the bent piece, and the inclined portion has a second angle relative to the first direction, and
 - the first angle is smaller than the second angle.
5. The spare tire cover supporting structure according to claim 3, wherein the engagement portion is provided in the mounting member.
6. The spare tire cover supporting structure according to claim 3, wherein the engagement portion is provided in the mounting member and the supporting member is provided in the transverse door.
7. The spare tire cover supporting structure according to claim 3, wherein the supporting member includes a planar portion between the projecting portion and said one of the transverse door and the second end of the spare tire cover from which the supporting member protrudes.